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MEMORANDUM July 2, 1962

To : Belford Brown

From : Leigh Fisher Associates, Inc.

Subject : General Aviation Use of San Francisco International Airport

In accordance with our letter of May 13, 1960, we submit herewith an analysis of general aviation in the San Francisco Bay Area with specific reference to general aviation use of San Francisco International Airport.

A series of scheduled air passenger traffic forecasts for San Francisco International Airport have been prepared over the past several years. A Memorandum to the Public Utilities Commission from Leigh Fisher Associates, dated May 21, 1959, set forth comparative scheduled air trade forecasts for San Francisco International Airport. The forecasts tabulated therein included those prepared by the FAA, the Airlines Traffic Sub-Committee, the Public Utilities Commission-Utilities Engineering Bureau, and Leigh Fisher Associates.

In December, 1960 a nine-county Bay Area air carrier and general aviation airport study was undertaken by Leigh Fisher Associates as a portion of "A Report Prepared for the Golden Gate Authority Commission." In the preparation of that report, the previous

1959 scheduled air trade forecasts were reviewed and basically reaffirmed.

Area Population

All forecasts of scheduled airline traffic must result from either tacit of explicit assumptions with respect to regional economic and population characteristics and growth. The subsequent analysis accepts the economic growth pattern forecasted by the U.S. Department of Commerce in a report for the U.S. Army Corps of Engineers entitled, Future Development of the San Francisco Bay Area, 1960-2020. That report sets forth "Economic Aspects of Comprehensive Survey of San Francisco Bay and Tributaries."

The present and forecasted population for the nine-county San Francisco Bay Area is set forth on Chart 1.

Chart 1

PRESENT AND FORECASTED POPULATION
San Francisco Bay Area

County	Actual 1960	Forecasted 1965*	Forecasted 1970
Alameda	908,209	977,000	1,048,000
Contra Costa	409,030	445,000	481,000
Marin	146,820	164,000	181,000
Napa	65,890	73,500	81,000
San Francisco	740,316	792,000	841,000
San Mateo	444,387	477,500	511,000
Santa Clara	642,315	734,500	827,000
Solano	134,597	148,000	161,000
Sonoma	147,375	165,000	183,000
Total Bay Area	3,638,939	3,976,500	4,314,000

* Interpolations of Decade Data

Sources: Bureau of the Census, 1960 Census of Population
Future Development of the San Francisco Bay Area, 1960-2020

The actual population data for 1960 is from the 1960 Census of Population; while the forecast data for the year 1970 are from the U.S. Department of

Commerce study cited above. Forecasts for the year 1965 are interpolations of the decade data.

The major concentration of the nine-county Bay Area population is incorporated in Alameda, Contra Costa, San Francisco, San Mateo and Santa Clara Counties. These five counties contained some 86% of the total nine-county population in 1960, and are expected to contain some 86% by 1970.

The major air commerce airports expected to serve the San Francisco Bay Area are Metropolitan Oakland International Airport, San Francisco International Airport and San Jose Municipal Airport.

Three primary factors will affect the future volume of passengers enplaning at San Francisco International Airport -- and consequently the total volume of scheduled aircraft activity at that airport:

1. The future distribution of Bay Area population with respect to the three major air carrier airports, and
2. The comparative frequency and convenience of scheduled airline flights at each of the three airports, and
3. Future policy of the Federal Government with respect to concentrating scheduled airline service to an economic region on a single airport.

Scheduled Airline Traffic

In part, the future volume of scheduled airline passengers at San Francisco International Airport can be estimated by a review of historical airline activity.

The number of airline arrivals and departures and the volume of enplaned and deplaned passengers is set forth on Chart 2.

Chart 2

SCHEDULED AIRLINE ACTIVITY
San Francisco International Airport

Year	Airline Arrivals and Departures	Enplaned Passengers	Deplaned Passengers	Total Passengers
1955	135,788	1,322,889	1,272,919	2,595,808
1956	129,149	1,523,030	1,493,015	3,016,045
1957	129,798	1,771,053	1,713,750	3,484,803
1958	128,421	1,807,167	1,788,856	3,596,023
1959	139,754	2,047,568	2,063,652	4,111,220
1960	146,022	2,325,634	2,311,401	4,637,035
1961	142,532	2,382,117	2,372,210	4,754,327

Source: Public Utilities Commission Records

The data, as compiled by the San Francisco Public Utilities Commission, includes the following airlines:

- American Airlines
- Japan Air Lines
- Pacific Air Lines
- The Flying Tiger Line
- Lufthansa German Airlines
- Pan American World Airways System
- British Overseas Airways Corporation
- United Air Lines
- Western Airlines
- West Coast Airlines
- Trans World Airlines
- Qantas Empire Airways
- Pacific Southwest Airlines

The volume of total passengers increased some 83% over the period 1955 through 1961 while the number of airline arrivals increased only some 5%.

The records of the San Francisco Public Utilities Commission do not provide data with respect to the actual number of airline revenue flight arrivals and departures, nor the division of airline traffic between domestic and international flights.

Chart 3 sets forth a tabulation of historical airline activity at San Francisco International Airport based upon data published by the Federal Aviation Agency. The domestic traffic data omit the intra-State carrier,

while the international data omit the foreign flag carriers. The FAA data represent some 80% to 90% of total passengers enplaning at San Francisco International Airport.

Chart 3

SCHEDULED AIRLINE ACTIVITY
San Francisco International Airport

	Aircraft Departures	Enplaned Passengers	Passengers Enplaned Per Flight
Domestic (Inter-State Carriers Only)			
1955	45,703	1,174,545	25.7
1956	47,845	1,321,048	27.6
1957	52,252	1,477,788	28.3
1958	51,925	1,524,957	29.4
1959	56,123	1,723,412	30.7
1960	55,740	1,856,271	33.3
1961 (F.Y.)	51,970	1,868,253	35.9
International (U.S. Flag Carriers Only)			
1955	1,443	57,270	39.7
1956	1,888	71,092	37.7
1957	2,120	81,549	38.5
1958	2,566	70,301	27.4
1959	2,549	82,955	32.5
1960	2,394	115,559	48.2
1961 (F.Y.)	2,610	119,087	45.6
Total			
1955	47,146	1,231,815	26.1
1956	49,733	1,392,140	28.0
1957	54,372	1,559,337	28.7
1958	54,491	1,595,258	29.3
1959	58,672	1,806,367	30.8
1960	58,134	1,971,830	33.9
1961 (F.Y.)	54,580	1,987,340	36.4

Source: FAA, Air Commerce Traffic Patterns

Passenger Distribution

The distribution of scheduled passengers as among the four Bay Area air carrier airports -- Sonoma County, San Francisco International, Oakland International and San Jose Municipal Airports -- for the period 1955 through Fiscal Year 1961 is set forth on Chart 4.

Chart 4

DISTRIBUTION OF BAY AREA SCHEDULED AIRLINE PASSENGERS
Bay Area Air Carrier Airports

Airport	Total	Area Air Carrier Airports			
		Sonoma County*	San Francisco International**	Oakland International*	San Jose Municipal*
1955					
Passengers	1,509,079	4,296	1,322,889	172,623	9,271
Percentage Distribution	100.0%	.3%	87.7%	11.4%	.6%
1956					
Passengers	1,690,875	3,284	1,523,030	148,189	16,372
Percentage Distribution	100.0%	.2%	90.1%	8.8%	1.0%
1957					
Passengers	1,943,850	2,987	1,771,053	147,242	22,568
Percentage Distribution	100.0%	.2%	91.1%	7.6%	1.2%
1958					
Passengers	1,956,605	2,705	1,807,167	118,711	28,022
Percentage Distribution	100.0%	.1%	92.4%	6.1%	1.4%
1959					
Passengers	2,215,225	3,161	2,047,568	130,033	34,463
Percentage Distribution	100.0%	.1%	92.4%	5.9%	1.6%
1960					
Passengers	2,479,484	3,281	2,325,634	110,668	39,901
Percentage Distribution	100.0%	.1%	93.8%	4.5%	1.6%
1961 (F.Y.)					
Passengers	2,670,068	2,713	2,533,499	91,278	42,578
Percentage Distribution	100.0%	.1%	94.9%	3.4%	1.6%

Source: * FAA, Air Commerce Traffic Patterns
** PUC Records

The major Bay Area air carrier airports are San Francisco International, Oakland International and San Jose Municipal. The proportion of scheduled airline passengers originating at both San Francisco International and San Jose Municipal Airports is increasing, while that at Oakland International and Sonoma County Airports is decreasing. Over the period 1955 through Fiscal Year 1961 the proportion of total Bay Area passengers originating from San Francisco International Airport increased from 87.7% to 94.9%. During the same period, the volume of passengers enplaning from San Jose Municipal Airport increased from .6% to 1.6%. Conversely, the proportion of passengers enplaning from Oakland International Airport decreased from 11.4% to 3.4% and Sonoma County Airport from .3% to .1%.

The historical development of air passenger travel patterns within an economic region is extremely important with respect to the generation of traffic at air carrier airports within that region. The historical passenger volume at San Francisco International Airport, the extent of private and public investment at that Airport, airline passenger propensity to use San Francisco International Airport, the FAA/CAB regional airport policy, and other factors all clearly indicate that, during the forecast period, at least 90% of Bay Area airline passengers will continue to be enplaned at San Francisco International Airport, in the absence of contrary government policy. In view of the new airport facilities recently constructed at Oakland International Airport and planned for San Jose Municipal Airport, as well as the recent growth in passenger volumes at San Jose Municipal Airport, it is assumed that some 10% of total Bay Area scheduled airline passengers will originate at Bay Area airports other than San Francisco International Airport.

Airline Passenger Forecasts

Forecasts of passengers to be generated from the nine-county San Francisco Bay Area for the forecast years 1965 and 1970 are set forth on Chart 5.

Chart 5

POPULATION INDEX AND PASSENGER FORECAST
NINE-COUNTY SAN FRANCISCO BAY AREA
AIR COMMERCE AIRPORTS

	Actual	Forecast	
	1961	1965	1970
Population	3,638,939[a]	3,936,500	4,314,000
Enplaned Passengers	2,518,686[b]	4,000,000	5,200,000
Passenger Index[c]	692	1,006	1,205

a - 1960 Census of Population.

b - Includes PUC records for SFIA for Calendar 1961, and published FAA data for Sonoma County, Oakland International and San Jose Municipal Airports for Fiscal Year 1961.

c - Number of enplaned passengers per 1,000 of population in the nine-county Air Trade Area.

Some 2,518,700 passengers were enplaned at the four air carrier airports in the nine-county San Francisco Bay Area in 1961. The estimated enplaned passengers, compared to the 1960 Census of Population, indicates that approximately 692 passengers were enplaned per 1,000 of population in the nine-county scheduled Air Trade Area.

Composite passenger forecasts for the nine-county San Francisco Bay Area indicate a total enplaned passenger volume of approximately 4,000,000 by the year 1965, increasing to approximately 5,200,000 by 1970.

The forecasted increases in enplaned passengers, as compared to the population increases forecasted by the U.S. Department of Commerce for the

nine-county San Francisco Bay Area indicate that approximately 1,000 passengers will be enplaned for every 1,000 of population in the primary air trade area by 1965; increasing to approximately 1,200 passengers per 1,000 of population by 1970.

A tabulation of enplaned passengers, passengers enplaned per flight, scheduled aircraft departures, and total airline arrivals and departures for San Francisco International Airport for 1961 and the forecast years 1965 and 1970 is set forth on Chart 6.

Chart 6

SCHEDULED AIRLINE TRAFFIC FORECASTS
San Francisco International Airport

	Actual	Forecasted	
	1961	1965	1970
Enplaned Passengers	2,382,100	3,600,000	4,700,000
Passengers Enplaned/Flight			
High	36	47	52
Low		42	48
Scheduled Aircraft Departures			
High	66,200	85,700	97,900
Low		76,600	90,400
Scheduled Airline Movements			
High	132,400	171,400	195,800
Low		153,200	180,800
Total Air Carrier Movements			
High	142,532	184,300	210,500
Low		164,700	194,400

The number of passengers enplaned at San Francisco International Airport for the period 1965 through 1970 are expected to approximate some 90% of the total number of passengers enplaned from the entire nine-county San Francisco Bay Area.

The number of passengers enplaned per flight is expected to increase substantially over the next 10-year period. An average of approximately 36

passengers were enplaned per scheduled aircraft flight departure from San Francisco International Airport in 1961. It is expected that the number of passengers enplaned per flight will increase to a range of 42 to 47 by 1965 and 48 to 52 by 1970.

Direct data is not available with respect to the total number of scheduled air carrier departures (and arrivals) at San Francisco International Airport. Based on available PUC and FAA data it is estimated that some 66,200 scheduled aircraft departures (and an equal number of arrivals) occurred at San Francisco International Airport in 1961. Annual scheduled aircraft departures are expected to increase to a range of 76,600 to 85,700 by 1965 and 90,400 to 97,900 by 1970.

Scheduled airline arrivals and departures amounted to some 93% of total air carrier operations in 1961. Assuming that this factor remains relatively constant, total air carrier operations should increase from the 142,500 experienced in 1961 to a range of 164,700 to 184,300 by 1965 and 194,400 to 210,500 by 1970.

In order to relate aircraft traffic volumes to the acceptance capacity of any given airport, it is necessary to consider the aircraft operation volume in terms of peak or busy hour volumes, rather than in terms of averages or annual totals, for it is the peak hour volumes which ultimately determine an airport's operational capacity.

A tabulation, by airport management, of air carrier scheduled arrivals and departures for the month of March, 1960 showed a peak of 37 peak hour operations in the period between 8:00 P.M. and 9:00 P.M. The first five ranking

peak hour scheduled air carrier operation periods in March, 1960 were as follows:

37	8:00 - 9:00 P.M.
33	6:00 - 7:00 P.M.
30	5:00 - 6:00 P.M.
30	7:00 - 8:00 P.M.
26	9:00 - 10:00 A.M.

A tabulation from the May, 1962 Official Airline Guide indicates the following peak hourly scheduled air carrier operations:

32	7:00 - 8:00 P.M.
29	5:00 - 6:00 P.M.
26	8:00 - 9:00 P.M.
24	7:00 - 8:00 A.M.
23	9:00 - 10:00 A.M.
23	9:00 - 10:00 P.M.

A summary of monthly "typical busy hour" aircraft operations at San Francisco International Airport is set forth on Chart 7, based on FAA tower data.

The "typical busy hour" is determined by the FAA in the following manner. Each tower chief selects the busy period during his shift. Aircraft operations for the twenty busiest hours per month are tabulated and the fourth highest number of operations in each month taken as the "typical busy hour." The typical busy hour is, therefore, not the hour of maximum operations per month.

The ratio of the busy hour air carrier operations to total monthly air carrier operations is set forth in the third column of Chart 7. The average ratio for the 28 months of data is .0034.

The final column on Chart 7 expresses the ratio of busy hour total operations to busy hour air carrier operations for the 28-month survey period. The average ratio for the 28-month period is 1.70 busy hour total aircraft operations per busy hour air carrier operations.

Chart 7

MONTHLY AND BUSY HOUR AIR TRAFFIC RELATIONSHIP
San Francisco International Airport

	Monthly Air Carrier Operations	Busy Hour Air Carrier Operations	Ratio - Busy Hour to Monthly A/C Operations	Busy Hour Total Operations	Ratio - Busy Hour Total to Busy Hour A/C Operations
1958					
December	10,945	38	.0035	62	1.63
1959					
January	11,291	20	.0018	57	2.85
February	10,293	29	.0028	93	3.21
March	11,311	37	.0033	76	2.05
April	11,001	36	.0033	64	1.78
May	11,370	48	.0042	78	1.63
June	11,178	41	.0037	69	1.68
July	12,003	56	.0047	102	1.82
August	12,128	58	.0048	79	1.36
September	12,055	48	.0040	72	1.50
October	12,597	42	.0033	65	1.55
November	12,046	32	.0027	58	1.81
December	12,481	36	.0029	70	1.94
1960					
January	12,391	41	.0033	73	1.78
February	11,519	46	.0040	76	1.65
1961					
January	12,077	31	.0026	56	1.81
February	10,121	36	.0036	65	1.81
March	11,401	35	.0031	49	1.40
April	10,696	49	.0046	72	1.47
May	11,031	28	.0025	58	2.07
June	12,074	32	.0027	61	1.91
July	12,143	42	.0035	51	1.21
August	13,308	46	.0035	64	1.39
September	12,469	51	.0041	80	1.57
October	12,558	28	.0022	50	1.79
November	12,591	38	.0030	60	1.58
December	12,063	47	.0039	58	1.23
1962					
January	12,647	51	.0040	80	1.57
Average - 28 months	11,778	40	.0034	68	1.70

Source: Based on FAA data at SFIA obtained from FAA District Airport Engineer's office.

Over the period covered by the survey, the ratio of busy hour total operations to busy hour air carrier operations appears to be generally declining. Since the volume of general aviation aircraft operations has generally increased over the period of the survey (see tabulation on Chart 10) it may be concluded that general aviation activity at San Francisco International Airport tends to occur at times other than the times of busy air carrier operations.

The future ratio of busy hour total operations to busy hour air carrier operations depends, in large part, upon future policy of the PUC, and cannot be forecasted at this time.

Applying the 1958-1962 average ratio of busy hour to monthly air carrier operations (.0034) to the forecasted average monthly air carrier operations for the years 1965 and 1970, an estimate of busy hour air carrier operations is established. The average busy hour air carrier movements for 1961 and the estimated busy hour air carrier movements for the forecast years 1965 and 1970 are summarized on Chart 8.

Chart 8

ESTIMATED BUSY HOUR AIR CARRIER AIRCRAFT MOVEMENTS
San Francisco International Airport

	Annual Air Carrier Operations	Monthly Average Air Carrier Operations	Busy Hour Air Carrier Operations
1961 - Actual	142,500	11,900	40
1965 - High	184,300	15,400	52
Low	164,700	13,700	47
1970 - High	210,500	17,500	60
Low	194,400	16,200	55

The ratio of future busy hour total movements to busy hour air carrier movements depends upon the policy of the Public Utilities Commission with

respect to the provision of facilities for general aviation on San Francisco International Airport, and cannot be properly forecasted until such policy has been established.

Substantial study has been and is currently being undertaken by the FAA, public and private research groups and others in an attempt to determine factors affecting airport capacity. No attempt is made herein to establish either the maximum or the optimum operational capacity of San Francisco International Airport.

A report prepared in 1960 by Airborne Instruments Laboratory for the FAA Bureau of Research and Development establishes some parameters and formulae for determining airfield capacity. A portion of the conclusions of that report state:

> "It does not appear that there will be any major improvement in runway operations or design (beyond design criteria now available) that will substantially increase VFR runway capacity, though IFR runway capacity can still be increased. Consequently, the most effective way to increase airport capacity is to construct parallel runways.
>
> "...intersecting runways -- if wind conditions permit their use -- can provide a substantial increase in capacity. The maximum increase in capacity with intersecting runways, when the intersection is near the downwind end of the runway, would be perhaps 65 percent. This would diminish to about single runway capacity if the intersection occurs near the upwind end of the runway."

It is concluded, on the basis of the foregoing data, forecasts and analyses, that San Francisco International Airport, with its present landing area facilities, has sufficient landing area capacity for scheduled airline use during the period through 1970. The volume of general aviation and non-scheduled air carrier operations which can be accommodated without adverse

effect on the scheduled air carrier movements is related to factors including runway alignment and separation, taxiway location, air traffic control procedures, mixes of aircraft types and operational speeds, conditions of approaches, numbers and spatial relationships of holding fixes, and a number of other factors.

It is clear, however, that with the 55-60 busy hour air carrier operations forecasted for 1970, definite restriction on non-air carrier use of San Francisco International Airport will be required if the capacity of the existing airfield facilities is to be reserved for air carrier use.

General Aviation Demand

A summary of general aviation aircraft activity at San Francisco International Airport is set forth on Chart 9. Local aircraft operations have shown a mixed trend with a sharp increase between 1955 and 1956, a decrease through 1958, an increase in 1960, and a sharp decrease in Fiscal Year 1961. Itinerant aircraft operations have shown a generally upward trend, with a slight decline in 1957 and again in Fiscal Year 1961.

Chart 9

GENERAL AVIATION AIRCRAFT ACTIVITY
San Francisco International Airport

Year	General Aviation Local	Itinerant	Total
1955	21,962	28,641	50,603
1956	28,762	29,730	58,492
1957	24,978	26,878	51,856
1958	21,920	33,914	55,834
1959	29,382	44,394	73,776
1960	30,265	45,221	75,486
1961 (F.Y.)	19,647	43,017	62,664

Source: FAA *Air Traffic Activity*

Chart 10

COMPARISONS OF GENERAL AVIATION AIRCRAFT ACTIVITY
Major U.S. Air Commerce Airports

Year	SFO		LAX		DCA		LGA		MDW	
	Number*	% of Total#	Number*	% of Total#	Number*	% of Total#	Number*	% of Total#	Number*	% of Total#
1955	50,603	24.7	48,150	18.2	29,847	13.2	53,986	20.3	56,211	14.7
1956	58,492	28.2	51,704	17.8	31,527	12.2	59,343	21.0	58,427	15.7
1957	51,856	25.7	48,984	15.3	36,028	13.0	64,409	21.4	65,481	16.0
1958	55,834	27.2	50,908	15.7	51,173	18.2	62,313	23.5	80,584	19.2
1959	73,776	31.4	54,505	17.2	52,917	16.9	67,730	24.7	84,115	19.5
1960	75,486	32.0	51,295	17.7	76,612	24.2	68,003	28.0	73,866	19.6
1961 (FY)	62,664	29.0	61,721	20.4	78,515	25.1	67,380	29.7	64,820	20.5

* Includes general aviation local and itinerant operations

Percent of total aircraft operations

Source: FAA, Air Traffic Activity

Chart 10 sets forth an historical comparison of general aviation aircraft operations at selected major air commerce airports, including:

San Francisco International Airport
Los Angeles International Airport
Washington National Airport
New York La Guardia Airport
Chicago Midway Airport

Substantial variations occur as among the selected air commerce airports with respect to the historical and current absolute levels of general aviation aircraft activity, and the ratio of that activity to total aircraft operations.

Chicago Midway Airport, with the highest volume of total aircraft operations through Fiscal Year 1961, had the highest volume of general aviation operations through 1959.

While the absolute volume of general aviation aircraft activity at San Francisco International Airport has been generally comparable to that of the other major air commerce airports, the percentage of general aviation activity to total activity has been significantly higher at San Francisco International Airport.

Current General Aviation Market: The scheduled air trade market for San Francisco International Airport is approximately as extensive as the nine-county San Francisco Bay Area. The general aviation air trade market is much more limited.

An air trade market is generally limited by the existence of other airports providing essentially similar services. The general aviation air trade market for San Francisco International Airport is generally limited by Oakland International and Hayward Municipal Airports on the east; by San Jose

Municipal Airport on the south; and by Sonoma County, Napa County, Buchannan Field and other essentially general aviation airports on the north. San Francisco International Airport primarily serves the general aviation air trade market of San Francisco and San Mateo Counties.

An analysis of the aircraft registered in San Francisco and San Mateo Counties is set forth on Chart 11.

Chart 11

ANALYSIS OF AIRCRAFT BY RESIDENCE OF OWNER

County and City	All Aircraft	Twin Engine	Recent*
San Francisco:			
San Francisco	422	81	85
Treasure Island	1	--	--
Total	423	81	85
San Mateo:			
Millbrae	12	2	5
San Mateo	38	4	7
Brisbane	5	--	--
Redwood City	40	--	4
Burlingame	14	2	4
Belmont	15	1	1
Daly City	6	--	--
San Bruno	14	--	1
Menlo Park	28	2	5
South San Francisco	15	3	3
San Carlos	42	1	22
Woodside	8	--	2
Hillsborough	7	1	1
Atherton	5	1	4
Half Moon Bay	12	1	2
La Honda	2	1	--
Sharp Park	5	--	--
Colma	1	--	--
Pacifica	6	--	--
Portola Valley	1	--	--
Pedro Valley	1	--	--
Total	277	19	61
TOTAL	700	100	146

* Manufactured in 1955 or later.

Source: From listings of Aircraft Owners & Pilots Association, Washington, D.C.

Of the 700 aircraft registered to owners in these two counties, some 423 aircraft, or 60%, are registered to owners in the City and County of San Francisco; while the remaining 40% are registered to residents of San Mateo County. Of the twin engine aircraft registered in the two counties, 81% are registered to owners in the City and County of San Francisco, with the remaining 19% registered to owners in San Mateo County. Some 146 of the aircraft have been manufactured in 1955 or later. Of these 146 aircraft, some 58% are registered to owners in the City and County of San Francisco.

Chart 12 sets forth an analysis of aircraft by horsepower, number of engines, age, and type of owner for San Francisco and San Mateo Counties.

Of the 423 aircraft registered to owners in the City and County of San Francisco, some 32% are registered to businesses and 45% to individuals.

In San Mateo County, of the 277 registered aircraft only some 18% are registered to business, while some 76% are registered to individuals. In total, some 57% of the aircraft registered in San Francisco and San Mateo Counties are registered to private individuals, while some 26% are registered as business aircraft. In general, aircraft registered in the City and County of San Francisco are of the higher horsepower type; with some 271 aircraft, or 64% of total registered aircraft, falling in the range of 100 horsepower or more. In San Mateo County, only some 54% of the aircraft fall in the range of 100 horsepower or more.

Some 81 twin engine aircraft are registered in the City and County of San Francisco, amounting to some 19% of the total registered aircraft. In San Mateo County, only some 19 of the registered aircraft are twin engine types, amounting to some 7%.

Chart 12

ANALYSIS OF AIRCRAFT BY HORSEPOWER, ENGINES, AGE, AND TYPE OF OWNER

	San Francisco		San Mateo		Total	Percent
Type of Owner						
Individual	191		210		401	57.3
Club	59		15		74	10.6
Business	136		49		185	26.4
Other	37		3		40	5.7
Total	423		277		700	100.0
Horsepower						
0- 99	123		114		237	33.9
100-199	100		86		186	26.6
200 & Over	171		63		234	33.4
Unknown	29		14		43	6.1
Total	423		277		700	100.0
No. of Engines						
Single	340		257		597	85.3
Twin	81		19		100	14.3
Other	2		1		3	.4
Total	423		277		700	100.0
Year of Manufacture	All	Twin	All	Twin		
Prior to 1941	20	3	26	--		
1941 to 1945	45	14	27	3		
1946 to 1950	149	17	122	1		
1951	8	1	3	--		
1952	9	1	8	--		
1953	6	1	6	--		
1954	5	2	2	--		
1955	11	2	5	1		
1956	21	11	14	3		
1957	15	7	8	3		
1958	15	2	15	3		
1959	23	8	19	1		
1960	--	--	--	--		
Not listed	96	12	22	4		
Total	423	81	277	19		
Active Aircraft	252	67	158	10	410	58.6
Inactive Aircraft	171	14	119	0	290	41.4
					700	100.0

Source: From listings of Aircraft Owners & Pilots Association, Washington, D.C.

Of the total of 700 aircraft registered in the two counties, some 410, or 59% are active aircraft -- that is, have current certificates of airworthiness. The remaining 290 aircraft, or 41%, are classified as inactive. The proportion of active to total registered aircraft is higher in San Francisco than in San Mateo County.

In the defined two-county general aviation air trade area -- San Francisco and San Mateo Counties -- served by San Francisco International Airport, a majority of aircraft ownership is concentrated in the City and County of San Francisco, indicating that the ideal location for a single general aviation airport to serve these two counties is in the northerly portion of San Mateo County.

General Aviation Forecasts: The historical trend in registered active civil aircraft in San Francisco and San Mateo Counties is set forth on Chart 13.

The data on Chart 13 are for active aircraft only, whereas the data on Charts 11 and 12 are for both active and inactive aircraft.

Total active civil aircraft in San Francisco County increased some 71% over the period 1955 through 1961. Over the same period the number of active civil aircraft registered in San Mateo County increased some 53%.

Some 75% of the multi-engine aircraft and 56% of the large single engine aircraft registered in the two counties in 1961 were registered in San Francisco County. Total active aircraft registered in the two counties increased some 64% over the period 1955 to 1961.

Chart 13

HISTORICAL TREND IN REGISTERED ACTIVE CIVIL AIRCRAFT
San Francisco and San Mateo Countied

	Total Active	Air Carrier	Multi-Engine	Single Engine 4 Place & Over	All Other
San Francisco County					
1955	175	1	29	47	98
1957	208	9	31	60	108
1959	264	18	44	79	123
1960	276	25	43	92	116
1961	300	22	51	105	122
San Mateo County					
1955	120	6	3	30	81
1957	127	4	7	43	73
1959	138	1	8	63	66
1960	154	1	10	74	69
1961	183	1	17	87	78
Total					
1955	295	7	32	77	179
1957	335	13	38	103	181
1959	402	19	52	142	189
1960	430	26	53	166	185
1961	483	23	68	192	200

Source: FAA, U.S. Active Civil Aircraft by State and County

The FAA forecast for active registered aircraft for the U.S. as a whole and for the Western Region is set forth on Chart 14.

Chart 14

FORECAST OF ACTIVE REGISTERED AIRCRAFT
U.S. Total and Western Region

		Actual	FAA Forecast	
		1961	1965	1967
U.S. Total :	Number	76,549	90,000	96,000
	Percent Increase	-0-	17.6	6.7
Western Region:	Number	18,697	22,325	24,100
	Percent Increase	-0-	19.4	8.0
Forecast by Category:				
U.S. Total		76,549	90,000	96,000
Multi-engine		7,243	10,000	11,600
Single engine 4-place & over		34,327	44,000	48,800
All other		34,979	36,000	35,600

Source: FAA, Aviation Forecasts, 1962-1967

Based upon the forecasts of the FAA and the recent historical increase in registered active aircraft in San Francisco and San Mateo Counties, total active aircraft registrations in the two-county general aviation trade area of San Francisco International Airport should approximate the following;

	San Francisco County		San Mateo County		Total	
1961 Actual	278		182		460	
	High	Low	High	Low	High	Low
1965	420	360	280	240	700	600
1970	540	480	360	320	900	800

The forecasted ranges are for active registered civil aircraft for San Mateo and San Francisco Counties, without respect to the airport on which those aircraft may be based. The forecasts assume, however, that adequate general aviation airport facilities can and are made available within reasonably convenient access of San Francisco and San Mateo Counties.

The forecasts set forth above suggest a doubling of registered aircraft in San Francisco and San Mateo Counties in the period 1960-1970. With the anticipated increase in aircraft usage in the next few years, the total volume of general aviation aircraft movements to be accommodated in this air trade area should increase more than threefold in the same period.

The increasing general aviation traffic must be accommodated on present San Mateo County airports, plus Hayward, Oakland and the proposed new Berkeley waterfront airport; on a new airport or airports developed in San Mateo, San Francisco, Alameda or Marin Counties, and possibly by addition of exclusive facilities for general aviation on San Francisco International Airport; or preferably on some combination of all the above.